

TCEQ Interoffice Memorandum

To: File
Thru: Johnny Cosgrove, P.E., Team leader, Dam Safety Section
From: Robert Calderon, P.E. *RJC* and Lisa Bishop, P.E. *LB*
Date: September 12, 2017
Subject: TXO4492 – Lake Ivanhoe Dam

TCEQ Dam Safety was notified by a representative for the owner (Rusty Harrison-Dam Supervisor for Ivanhoe) of a partial failure of the Lake Ivanhoe Dam due to a storm event (Hurricane/Tropical Storm Harvey) the week of August 26th, 2017. The owner requested a site visit and assessment of the structure. Dam Safety staff visited the dam on September 12, 2017 to observe the dam and assess the storm damage.

The owner stated that the storm event was approximately 27 inches of rain over a 5 day period and that the reservoir began to empty out (close to the end of the storm event) around the service spillway outlet pipe (15" steel pipe). This led to the partial collapse of the upstream embankment around the service spillway drop inlet and a loss of embankment material downstream into the natural channel. It is not clear if the pipe itself failed (holes or breaks in the pipe) or if sediment went around the pipe area through the dam embankment. Dam Safety noted in the July 2012 inspection that the area around the pipe outlet appeared to be an area of seepage. Additionally in that inspection, the service spillway outlet pipe (the exposed portion at the toe of the downstream slope) was noted to be rusted and corroded all the way through in places. However, whichever one of these mechanisms resulted in the collapse of the upstream embankment, this is considered by dam safety to be a partial "piping failure." The dam did not appear to overtop as the debris line was approximately 2-ft below the top of dam. The emergency spillway did engage and performed well as only minor erosion was noted in the channel. The owner noted that at one point during the storm there was up to 2-ft of water over the roadway just 400-ft downstream of the dam. This water accumulation was reported to have been from the storm event and not as a result of the loss of the reservoir.

The following observations were noted as shown in the attached figure and photos: The partial failure was located at the midpoint of the dam (immediately to the left of service spillway alignment) estimated at 25-ft wide by 9-ft high (**See Photos 1-9**). None of the service spillway pipe was exposed (only the drop structure section). The lake level was observed to be lowered to the approximate elevation of the bottom of the drop inlet. Large amounts of sediment were noted at the toe of the embankment and in the downstream channel. The spillway outlet, which was exposed and viewed during the last

inspection in June of this year, was covered with about 2-ft of silt and water. Only minor erosion was noted in the emergency spillway channel (reported to be approximately 1-ft of flow in the channel during the storm event) as it appeared to hold up very well.

The dam was last inspected on June 14, 2017 (TCEQ Dam Safety routine inspection), and was found in fair condition (inspection report still being written). Based on that inspection and all other dam safety records, the height of the dam is 19 feet with an estimated normal reservoir capacity of 105 acre-feet and a maximum capacity of 218 acre-feet.

Based on a conversation between Dam Safety and the owner (October 23, 2017), the owner is investigating the possibility of rebuilding the dam. Coordination with TCEQ Dam Safety is required for any rebuild or modification of the dam (including review and approval of plans). If the decision is made to permanently breach the dam, it is recommended that plans be designed to allow for a wide enough opening to keep the reservoir from increasing and causing an unsafe condition for potential downstream hazards, as this will limit the dam owner's liability. Additionally, based on the residence located immediately downstream of the embankment, a breach of the dam should be placed at the current location of the service spillway pipe to prevent a buildup of the reservoir and subsequent failure of the dam in its weakened condition. Finally, prior to any action being taken to breach or repair the dam, consideration should be given to restrict access to the area near the collapsed portion of the dam and to install sedimentation controls downstream of the spillway outlet.

Bryan W. Shaw, Ph.D., P.E., *Chairman*
Toby Baker, *Commissioner*
Jon Niermann, *Commissioner*
Richard A. Hyde, P.E., *Executive Director*



TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

November 29, 2017

Mr. Rusty Harrison, Dam Supervisor
City of Ivanhoe
880 Charmaine Dr
Woodville, Texas 75979

Subject: Lake Ivanhoe Dam - TXo4492

Dear Mr. Harrison:

As you are aware, members of the TCEQ Dam Safety program inspected the above-mentioned dam on September 12, 2017 (by request from the owner) as a partial dam failure inspection. The partial failure was located at the midpoint of the dam (service spillway location) estimated at 25-ft wide by 9-ft high. A more detailed assessment of the condition of the dam is included in the attached memo.

Based on a conversation between TCEQ Dam Safety and the owner (October 23, 2017), the owner is investigating the possibility of rebuilding the dam. Coordination with TCEQ Dam Safety is required for any rebuild or modification of the dam (including review and approval of engineered construction plans). If the decision is made to permanently breach the dam, it is required that plans be designed to allow for a wide enough opening to pass the dam's design storm and keep the reservoir from increasing and causing an unsafe condition for potential downstream hazards. Additionally, the current condition of the dam presents a hazard to the immediate downstream residence (previous convenience store). Based on this hazard assessment, an engineered breach at the current service spillway pipe location should be installed to prevent a possible buildup and failure of the reservoir in its weakened condition.

Lastly, prior to any action being taken to breach or repair the dam, consideration should be given to restrict access to the area near the collapsed portion of the dam and to install sedimentation controls downstream of the spillway outlet. Please review the enclosed memo and respond to our office by **April 15, 2018**, with a written plan of action that addresses

Mr. Rusty Harrison
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November 29, 2017

the noted dam deficiencies. It is understood that certain proposed actions will require a Texas licensed Professional Engineer and your written response for these specific recommendations may be limited to notifying us of your time frame for addressing the issues of concern. If you would like to discuss any of this in further detail, please feel free to contact me at (512)239-1399 or Johnny Cosgrove, Team Leader, at (512)239-4307.

Sincerely,



Robert D. Calderon, P.E.
Engineer, Dam Safety Program
Critical Infrastructure Division, MC-177

Enclosure: Partial dam failure memo

**IVANHOE PROPERTY OWNERS IMPROVEMENT
ASSOCIATION INC.**

**880 Charmaine Dr. East – Woodville, TX 75979
(409) 283-3653*landoflakes880@gmail.com**

April 7, 2018

Mr. Robert D. Calderon, P.E.
Engineer, Dam Safety Program
P.O. Box 13087
Austin, TX 78711-3087

Subject: Lake Ivanhoe Dam - TX04492

Dear Mr. Calderon,

Ivanhoe Dam is owned by the Ivanhoe Property Owners Improvement Assoc., Inc. (IPOIA), and this letter is sent to address what has currently been done at the site of the partial failure and what plans for the future of the dam are being determined by the board and membership of the IPOIA.

Per your letter dated November 29, 2017, we have installed a fence around the collapsed portion of the dam to restrict access. Rusty Harrison, Dam Supervisor for the City of Ivanhoe inspects the area regularly to insure that no blockage occurs at the breach so that the water continues to flow from the lake and does not build up causing additional problems.

On February 20, 2017 Board members of the IPOIA along with Rusty Harrison met with a representative from LJA Engineering to discuss plans for breaching or rebuilding Ivanhoe Dam. We do understand that any plans that are presented from LJA must first obtain TCEQ approval before moving forward. As you know in the past, work on this dam could only be done if funds became available to do so. Not knowing what the cost would be to breach or rebuild until we get those numbers from a contractor after the plans are approved, we cannot at this time give TCEQ a time frame on when the work will be done. If there is a time that TCEQ would require something to be done, please inform us and we will try to move the process along.

The IPOIA response to the deadline of April 15, 2018 mentioned in your letter of November 29, 2017 is to hire LJA Engineering to come up with a plan to breach or repair Ivanhoe Dam and for those plans to be given to TCEQ for approval when completed.

Sincerely,


Karen Sikora, President IPOIA

cc: Rusty Harrison - City of Ivanhoe Dam Supervisor
Mayor Bennett - City of Ivanhoe
Johnny Cosgrove, P. E. Team Leader, Dam Safety Section TCEQ

Bryan W. Shaw, Ph.D., P.E., Chairman

Toby Baker, Commissioner

Jon Niermann, Commissioner

Stephanie Bergeron Perdue, Interim Executive Director



TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

April 16, 2018

Ms. Karen Sikora
President, IPOIA
880 Charmaine Dr. East
Woodville, Texas 75979

Subject: Lake Ivanhoe Dam - TX04492
Action Plan Acceptance

Dear Ms. Sikora:

This letter is to note that as of April 11, 2018, the TCEQ Dam Safety Program is in receipt of an Action Plan for the partially failed Lake Ivanhoe Dam. Per comments and recommendations made in the most recent inspection (September 12, 2017), this letter satisfies the plan of action for the dam. However, regarding the timetable inquiry in your letter, it is highly recommended that the dam be intentionally breached as soon as possible due to its current vulnerable condition and the hazard it presents to downstream development. If current funding does not allow for a permanent engineered breach (with a sufficiently wide breach opening based on an engineered hydraulic study), then at a minimum it is recommended that the dam be breached under supervision of a professional engineer with dam safety experience and in accordance with emergency provisions per TCEQ Dam Safety rules (Chapter 299.45).

While this course of action will not remove the threat in its entirety, it will reduce the chance of a catastrophic dam failure if a significant storm event should suddenly fill the impoundment and fail the remaining dam embankment with an elevated reservoir. The owner may start such emergency action without TCEQ Dam Safety review and approval of construction plans.

As noted in our prior correspondence, one residence is located immediately downstream of the dam and is at risk from a potential dam failure. Also, Ivanhoe Drive is at risk of washing out from a complete failure of the Lake Ivanhoe Dam. There is significant liability for IPOIA and immediate steps should be taken to address this liability. Please update TCEQ Dam Safety with the status of your efforts by June 15, 2018. If you have questions or would like to discuss any of this in further detail, please feel free to contact me at (512)239-1399 or Johnny Cosgrove, Team Leader, at (512)239-4307.

Sincerely,

A handwritten signature in black ink, appearing to read "RDC".

Robert D. Calderon, P.E.
Engineer, Dam Safety Program
Critical Infrastructure Division, MC-177



Everett Griffith, Jr. & Associates Inc.

June 18, 2018

Johnny Cosgrove, Team Leader
Texas Commission on Environmental Quality
Dam Safety Program
P.O. Box 13087
Austin, Texas 78711

Re: Lake Ivanhoe Dam - Tx04492

Dear Johnny:

It was a pleasure to visit with you last week to discuss the above referenced site. This letter is being sent to update you on the current status of the dam situation. Back in May of this year the Ivanhoe Property Owners Improvement Association (IPOIA) retained the services SRB Enterprises to permanently breach the dam at Lake Ivanhoe.

The IPOIA notified EGA Engineers of the completed construction and requested our services to verify that the breaching of the dam was completed satisfactorily. Upon inspection it was very apparent that the work had been completed exceptional well. Some of the details of construction are as follows: vertical depth of breach is approximately 25' from top of dam to flowline of breach, width of breach is 25' with a vegetation barrier with rip-rap along the bottom of breach, side slopes +/- 45 degree angle with erosion protection on the slopes.

I have requested the IPOIA to include photographs of the completed construction. If you have any questions or need additional information please feel free to contact me at 903/658-2065 or bstaehs@everettgriffith.com.

Sincerely,

A handwritten signature in black ink, appearing to read "Bob Staehs".

Bob Staehs, P.E.
Project Manager

cc: Karen Sikora
President, IPOIA

**IVANHOE PROPERTY OWNERS IMPROVEMENT
ASSOCIATION INC.**

**880 Charmaine Dr. East – Woodville, TX 75979
(409) 283-3653*landoflakes880@gmail.com**

June 25, 2018

Mr. Robert D. Calderon, P.E.
Engineer, Dam Safety Program
P.O. Box 13087
Austin, TX 78711-3087

Subject: Lake Ivanhoe Dam - TX04492

The breaching of Ivanhoe Dam has been completed. Due to the ten inch rain that we had at the end of March which filled the lake bed to within 2 feet of the top and threatened several homes plus the main entry/exit to the City, the IPOIA board decided that it was necessary to breach the dam as soon as a contractor could be hired to do so. We hired SRB Enterprises, LLC, P.O. Box 834, Colmesneil, TX. 75951. We then contacted a firm located in Lufkin that had done previous engineering work on dams here in Ivanhoe. The firm is Everett Griffith, Jr. & Associates Inc. P.O. Box 1746, Lufkin, TX 75902. Mr. Bob Staehs came and looked at the work stating that a silt fence should be installed along the breached water flow area to prevent sediment from filling that area. The silt fencing has been installed and runs 200' on each side of the water flow area. Mr. Staehs called and informed us that his report would not be complete until a few days after the June 15th deadline TCEQ had established for the IPOIA to respond with our plans for the dam and said he had called TCEQ and was told a few days delay was no problem. I have enclosed the engineering report and pictures of the finished work on Ivanhoe Dam. As of this date there are no plans in place to reconstruct the dam. The IPOIA will contact TCEQ if we make any plans in the future to do so.

Sincerely,



Karen Sikora, President IPOIA

cc: Rusty Harrison - City of Ivanhoe Dam Supervisor
Mayor Bennett - City of Ivanhoe
Johnny Cosgrove, P. E. Team Leader, Dam Safety Section TCEQ

Karen Sikora – President John Craven – Vice President Debbie Peterson – Treasurer
Marian Blackstone – Secretary Glenn Beirnes – Parks & Lakes

**IVANHOE PROPERTY OWNERS IMPROVEMENT
ASSOCIATION INC.**
880 Charmaine Dr. East – Woodville, TX 75979
(409) 283-3653 *landoflakes880@gmail.com

June 25, 2018

City of Ivanhoe
870 Charmaine Dr. E.
Woodville, TX 75979

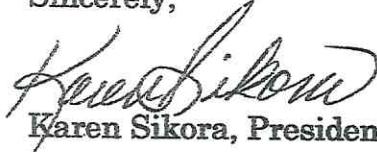
To: Mayor Bennett
Rusty Harrison – City of Ivanhoe Dam Supervisor

The breaching of Ivanhoe Dam is complete and a final report has been sent to TCEQ as well as the engineers report. I have attached copies for your records.

The IPOIA has compiled a book which details step by step procedures and includes pictures if at any time you need additional information.

As stated at previous board meetings, the IPOIA has no plan in place at this time to rebuild Ivanhoe Dam due to lack of funds.

Sincerely,



Karen Sikora, President IPOIA